

## CLAIMS:

1. User interaction system, comprising:  
- an electrical apparatus;  
- a portable pointing device operable by a user for pointing to a region in space;  
- a camera taking a picture; and  
5 - a digital signal processor, capable of receiving and processing the picture, and capable of transmitting user interface information derived from the picture to the electrical apparatus,  
characterized in that the camera is connected to the pointing device so that in operation it images the region pointed to.

10 2. User interaction system as claimed in claim 1, wherein the user interface information comprises apparatus control data for controlling operation of the electrical apparatus.

15 3. User interaction system as claimed in claim 1, wherein the digital signal processor comprises an object characterizing means for characterizing an object or part of the object present in the picture of the region imaged by the camera, by providing first object characterizing features to a comprised object identification means for identifying the object, and which object identification means is capable of outputting object identification data from  
20 which the user interface information is constructed.

4. User interaction system as claimed in claim 1, wherein the digital signal processor comprises:

- motion trajectory estimation means for estimating a motion trajectory of the  
25 pointing device and outputting a first motion characterizing signature, a signature being a mathematical abstraction of the motion trajectory; and

- signature identification means for identifying the first motion characterizing signature and outputting command identification data, which represents a user interaction

command, corresponding with the first motion characterizing signature, from which command identification data the user interface information is constructed.

5 5. User interaction system as claimed in claim 3 and 4, wherein the digital signal processor comprises identification improvement means, which are capable of further improving a probability that the object represented as object identification data, and user interaction command represented as command identification data, are more reliably identified based on predetermined rules, yielding more reliable user interface information.

10 6. User interaction system as claimed in claim 5, wherein the predetermined rules comprise probabilistic calculation of the likelihood of an {object identification data, command identification data }- pair, taking into account at least one of the following a priori known information units {room in which the pointing device resides, previous command issued by user, statistical frequency that a user issues a particular command and time of the day}.

7. User interaction system as claimed in claim 3, wherein the digital signal processor comprises object association means for providing to the object identification means object association data - comprising at least one of the data entities being: associated object characterizing features and object related data- ,

20 the object association data being derivable from object template data in object memory originating from at least one of the methods:

- the object template data is obtained from object training means performing a predetermined calculation on second object characterizing features outputted by object

25 characterizing means; and

- the object template data is derived from inputted object data.

8. User interaction system as claimed in claim 4, wherein the digital signal processor comprises signature association means for providing to the signature identification means signature association data - comprising at least one of the data entities being: associated signature features and command related data - ,

30 the signature association data being derivable from signature template data in signature memory originating from at least one of the methods:

- the signature template data is obtained from signature training means performing a predetermined calculation on a second motion characterizing signature outputted by the motion trajectory estimating means; and
- the command template data is derived from inputted command data.

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9. User interaction system as claimed in claim 4, wherein the first motion characterizing signature is derived on the basis of successive pictures imaged by the camera at respective instances of time.

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10. Pointing device for use in a user interaction system as claimed in claim 1, characterized in that it comprises a camera and is capable of sending a picture to a digital signal processor.

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11. Pointing device as claimed in claim 10, wherein the pointing device is capable of sending a picture to the digital signal processor, which is capable of sending user interface information to an electrical apparatus based on the picture.

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12. Pointing device as claimed in claim 10 wherein the digital signal processor is comprised in the pointing device.

13. Pointing device as claimed in claim 10, comprising motion sensing means for sensing a motion trajectory of the pointing device.

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14. Pointing device as claimed in claim 10, comprising a characteristic projector for optically projecting a characteristic pattern towards a region pointed to.

15. Pointing device as claimed in claim 10, comprising a programmable user interface code generator and a wireless transmitter for transmitting the code to the electrical apparatus.

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16. Pointing device as claimed in claim 10 comprising feedback means for feedback of user interface information.

17. Electrical apparatus for use in a user interaction system as claimed in claim 1, characterized in that interface means are comprised which allow the electrical apparatus to send information about supported commands to a pointing device as claimed in claim 1, based on an "identify supported commands" call of the pointing device to the electrical  
5 apparatus.